

## About this Manual

We've added this manual to the Agilent website in an effort to help you support your product. This manual is the best copy we could find; it may be incomplete or contain dated information. If we find a more recent copy in the future, we will add it to the Agilent website.

## Support for Your Product

Agilent no longer sells or supports this product. Our service centers may be able to perform calibration if no repair parts are needed, but no other support from Agilent is available. You will find any other available product information on the Agilent Test & Measurement website, [www.tm.agilent.com](http://www.tm.agilent.com).

## HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement, semiconductor products and chemical analysis businesses are now part of Agilent Technologies. We have made no changes to this manual copy. In other documentation, to reduce potential confusion, the only change to product numbers and names has been in the company name prefix: where a product number/name was HP XXXX the current name/number is now Agilent XXXX. For example, model number HP8648A is now model number Agilent 8648A.

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# HP BenchLink XL 54600

*Software for the HP 54600-Series Oscilloscopes*

Getting Started With  
HP BenchLink XL

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## Warranty

A copy of the specific warranty terms applicable to your Hewlett-Packard product can be obtained from your local HP Sales and Service Office.

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## Exclusive Remedies

The remedies provided herein are the Buyer's sole and exclusive remedies. HP shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

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## Printing History

New editions are complete revisions of the manual. Update packages, which are issued between editions, may contain additional information and replacement pages which you merge into the manual. The dates on this page change only when a new edition is published.

Edition 1 (Part Number 54600-97030) July 1999  
Printed in U.S.A.



# HP BenchLink XL 54600

Software for the HP 54600-Series Oscilloscopes

## Software Overview

HP BenchLink XL offers a set of connectivity tools that enable you to quickly and easily move data from your HP 54600-Series Oscilloscopes to your PC. Whether you are an experienced programmer or would prefer not to program at all, HP BenchLink XL is designed to give you a high-level of instrument control using software applications that you are probably already using on your PC.

## For the Non-Programmer — A Simple Toolbar Add-In for Excel and Word

HP BenchLink XL provides an easy-to-use toolbar that enables you to perform simple waveform data and image transfers directly into Microsoft® Excel® or Microsoft® Word®. Once installed, the toolbar is automatically loaded and operates just like any other toolbar in these applications. Use the **Tools | Add-Ins** menu to add or remove the toolbar from the application. The toolbar is shown below with a brief description of each toolbar button.

**NOTE:** To get started with the toolbar, you will need to open Excel or Word. The toolbar will automatically load when you open the application.



**About HP 54600 Scope Toolbar** Returns the software version number and allows you to select the local language for the dialog boxes and help system.



**Connect to Scope** Configures the remote interface connection to the oscilloscope.



**Save / Load Scope Settings** Stores the oscilloscope settings to a file or downloads a previously-stored settings file to the oscilloscope.



**Get Waveform Data** Uploads waveform time/voltage data from the oscilloscope to the active worksheet or document.



**Get Screen Image** Captures an image of the oscilloscope's display and places it in the active worksheet or document.



**Get Single Measurement** Acquires a single measurement (rise time, duty cycle, frequency, etc.) from the oscilloscope and places it in the active worksheet or document.



**Toolbar Help** Provides step-by-step explanations to help you learn to use the toolbar.

## Excel Macro Support

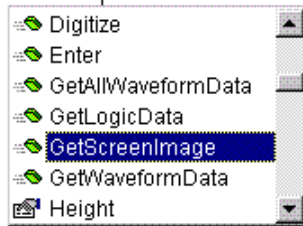
You can create a macro for any of the toolbar operations using the Excel macro recording feature. You can then run the macro to automatically "play back" the recorded actions.

## For the Programmer — An ActiveX Custom Control

For more sophisticated programming, an ActiveX™ Custom Control is provided with HP BenchLink XL to make it easy to program your oscilloscope using common programming environments such as Visual Basic®, Visual Basic® for Applications (Excel and Word), and Visual C++®. The **HP54600Scope** Control gives you all of the functionality of the toolbar plus the added capability to programmatically control the operation of the oscilloscope. Within the Microsoft environment, you have complete access to all of the property pages, context-sensitive help, and persistence.

As shown in the sample below, it only takes a few lines of Visual Basic code to capture the waveform data and obtain a screen image from the oscilloscope using the **HP54600Scope** Control.

```
With Scope
    .AnalogChannels(1).Enabled = True
    .GetWaveformData Channel_1, 200, xdata, ydata
    Image1.Picture = .GetS
```



The first line of code enables Channel 1 on the oscilloscope. The second line of code captures the waveform time/voltage pairs (200 waveform points) from Channel 1 and stores the data in two arrays. The third line of code shows the use of Microsoft's "IntelliSense" feature to select the function that places the screen image into an Image control.

To help you become familiar with the structure and operation of the **HP54600Scope** Control, we have included several programming examples with HP BenchLink XL. These files will be loaded on your PC as part of the installation procedure. For more information, navigate to:

**Start | Programs | HP BenchLink XL | HP54600 | Samples**

We have also included several getting started documents to help you become familiar with the **HP54600Scope** Control in Excel, Visual Basic, and C++. For more information, navigate to:

**Start | Programs | HP BenchLink XL | HP54600 | Automation Server Help**

## Toolbar Overview



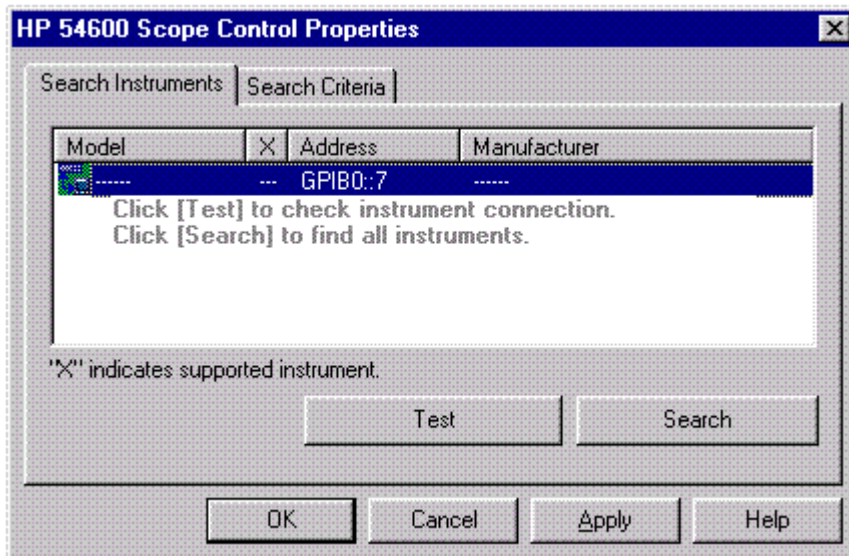
### About HP 54600 Scope Toolbar

The dialog boxes and help system are available in several languages. Use the following dialog box to select the desired language.



### Connect to Scope

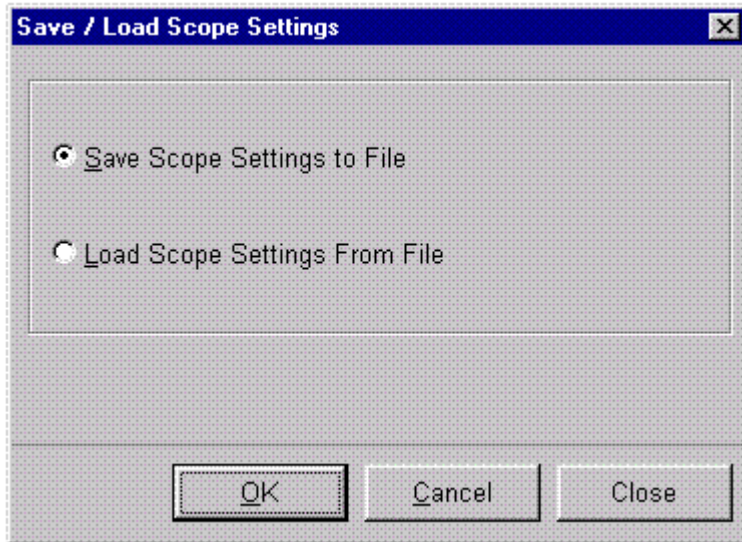
HP BenchLink XL makes it easy to establish an interface connection between your oscilloscope and your PC. Whether you are connecting to the oscilloscope using an HP-IB (GPIB) port or an RS-232 (COM) port, HP BenchLink XL does the work for you. Simply press the **Search** button (see below) and HP BenchLink XL determines which instruments are connected to your PC.





## Save / Load Scope Settings

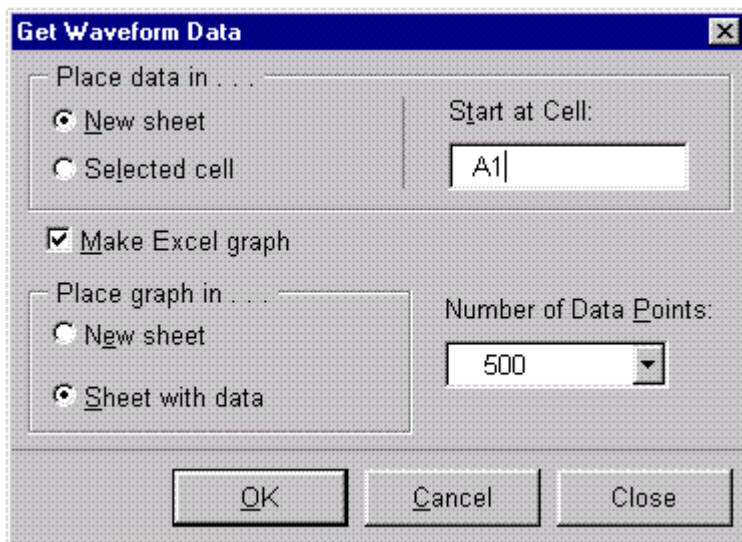
HP BenchLink XL gives you the ability to store the current oscilloscope settings to a file on your PC or download previously-stored settings to your oscilloscope. The oscilloscope settings are stored in a binary format (.scp file extension).



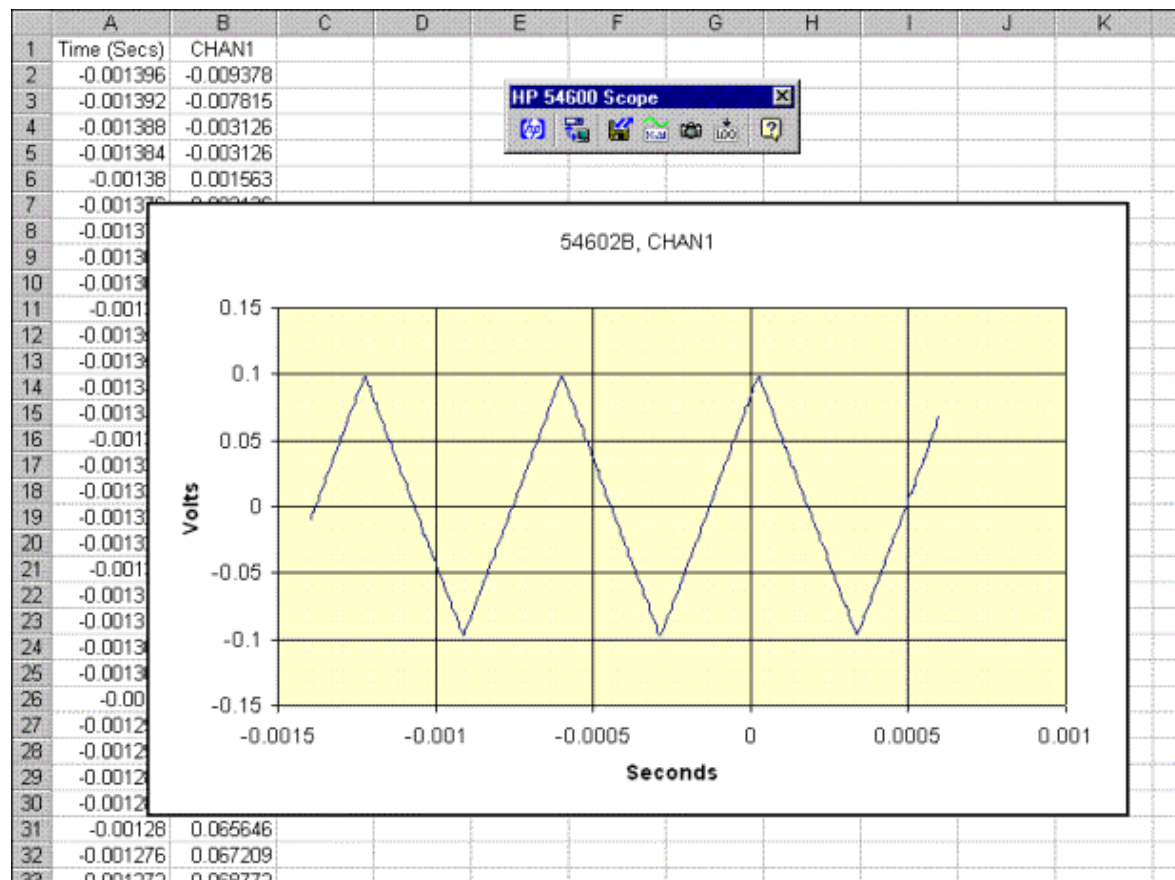
## Get Waveform Data

One of the most powerful features of HP BenchLink XL is the ability to capture waveform data (time/voltage pairs) from the oscilloscope. From Excel, the waveform data is automatically placed in rows and columns on the spreadsheet and you can also generate a graph using the captured data. From Word, the waveform data is downloaded, a graph is generated, and both are placed in the active document.

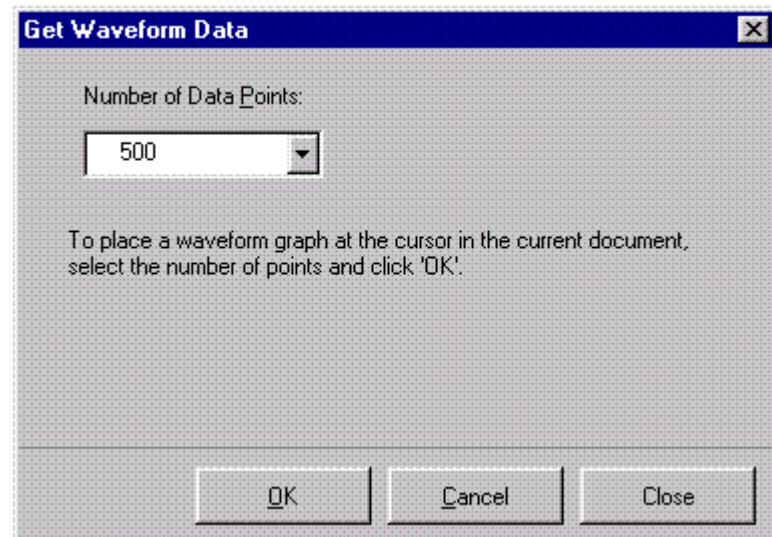
### Excel Dialog Box:



A sample from Excel is shown below. When the waveform data is uploaded from the oscilloscope, the points are automatically plotted using Excel's built-in charting function.



Word Dialog Box:

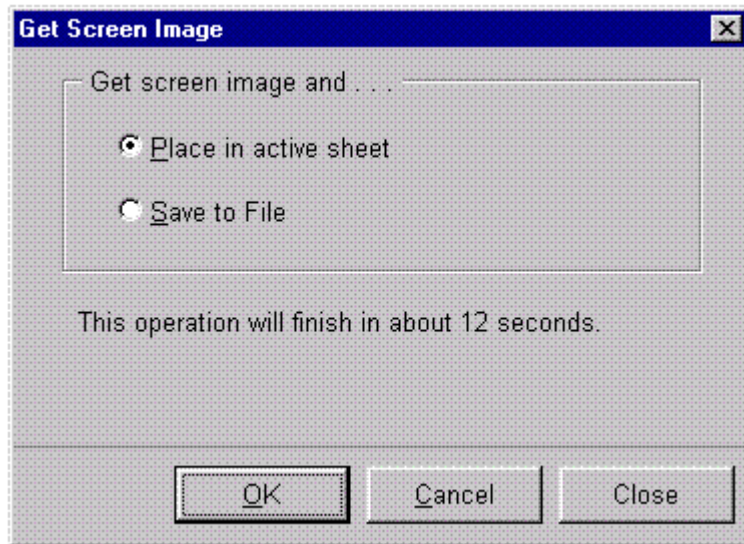




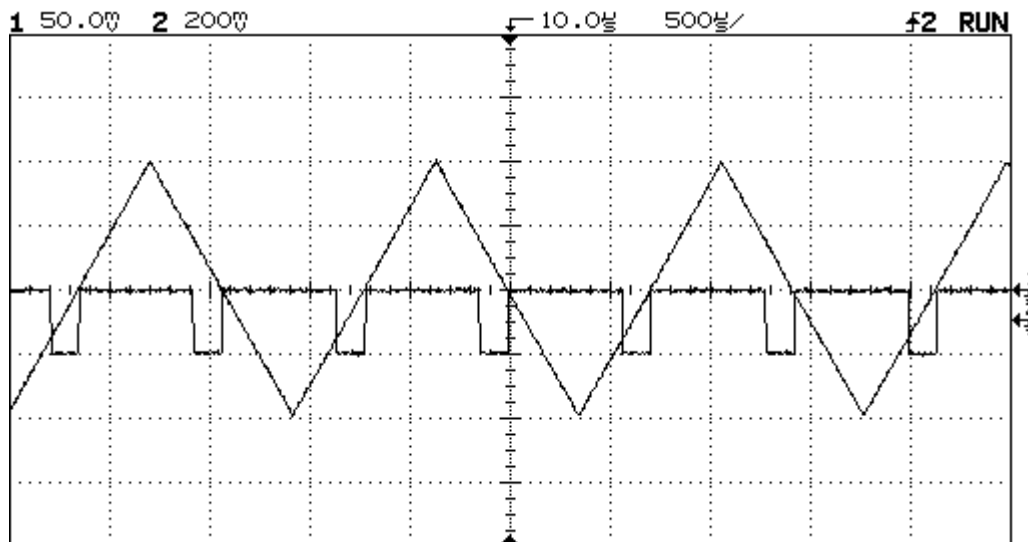


## Get Screen Image

For documentation purposes, you may want to capture a "snapshot" of the oscilloscope display. With HP BenchLink XL, it just takes a few seconds to insert the image into your Excel or Word document. Note that you can also save the image to a file (.bmp format).



A sample screen image is shown below.

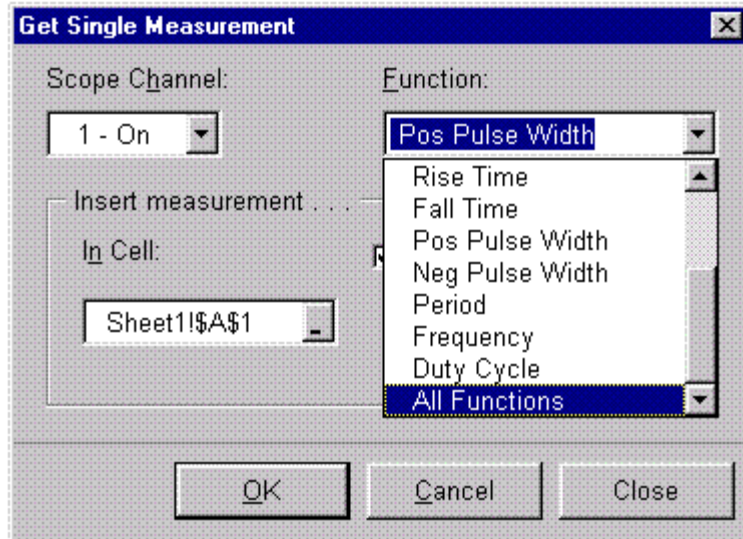




## Get Single Measurement

For some applications, you may want to capture a single measurement (rise time, duty cycle, frequency, etc.) and place it in the active worksheet or document. From the **Function** drop-down list (see below), you can select a specific measurement or select "All Functions" to place all 12 available measurements in the active document.

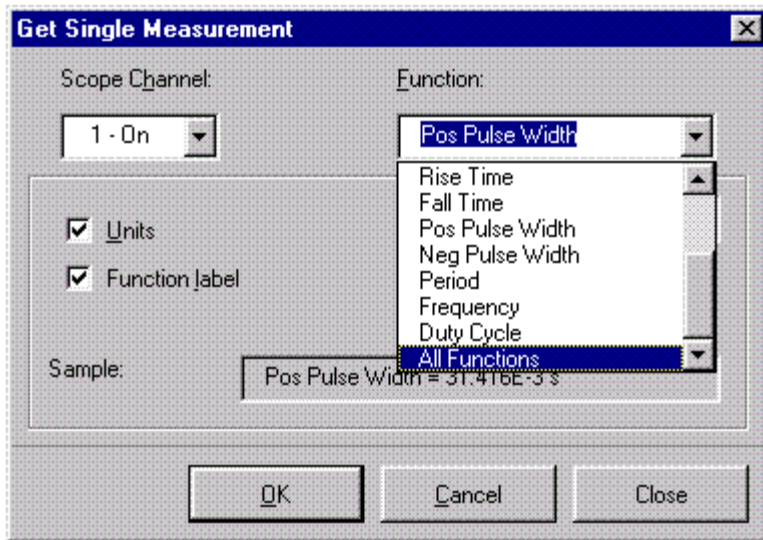
### Excel Dialog Box:



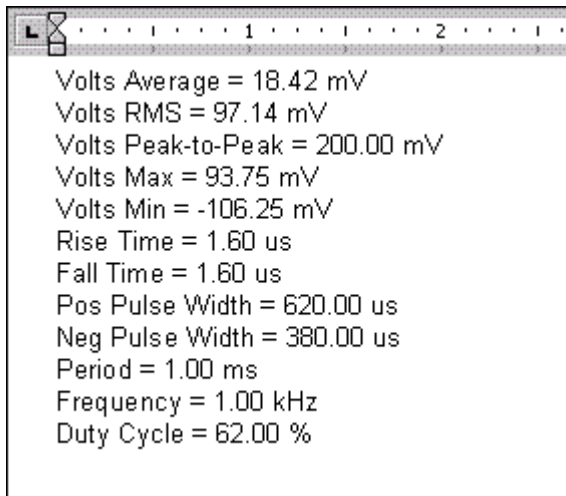
A sample from Excel is shown below. In Excel, the measurement is placed in the highlighted cell. If desired, you can annotate each reading (mV, kHz, etc.). The sample below shows all 12 available measurements placed in the active worksheet.

	A	B	C	D
1	874.782	uV, Volts Average		
2	57.668	mV, Volts RMS		
3	198.438	mV, Volts Peak-to-Peak		
4	101.563	mV, Volts Max		
5	-98.438	mV, Volts Min		
6	570	us, Rise Time		
7	570	us, Fall Time		
8	710	us, Pos Pulse Width		
9	705	us, Neg Pulse Width		
10	1.425	ms, Period		
11	699.301	Hz, Frequency		
12	49.823	%, Duty Cycle		
13				
14				

## Word Dialog Box:



A sample from Word is shown below. In Word, the measurement is placed at the cursor in the active document. If desired, you can annotate each reading (mV, kHz, etc.). The sample below shows all 12 available measurements placed in the active document.



## Toolbar Help

Like most PC applications, a help system is included with HP BenchLink XL to assist you with the operation of the toolbar. The help system and all dialog boxes are available in multiple languages.

## Software Installation

### Installing HP BenchLink XL

You can install HP BenchLink XL from the CD-ROM included with your oscilloscope's interface module or you can download the software from the Hewlett-Packard web site ([www.hp.com/go/bi](http://www.hp.com/go/bi)). Software updates and future releases will also be available from this web site.

After installing the software on your PC, go to the **Tools | Add-Ins** menu in Excel or Word to enable HP BenchLink XL operations in the selected application. For more information on using the **HP54600Scope** Control with Visual Basic, refer to the help file included with the ActiveX Control. Note that all of the necessary I/O functionality is also loaded when you install the software, including the ability to control your oscilloscope using both Hewlett-Packard and National Instruments interface cards and standard RS-232 (COM) ports on your PC.

### Minimum System Requirements

#### *PC Operating System Requirements:*

##### Windows® 95 or Windows® 98

- 486DX/66
- 16 MB RAM
- 20 MB free disk space

##### Windows NT® 4.0

- Service Pack 3
- Pentium-90
- 32 MB RAM
- 20 MB free disk space

#### *Environments Supported:*

##### Applications

- Microsoft Excel 97
- Microsoft Word 97

##### Software Development

- Visual Basic 5.0/6.0
- VBA 5.0
- HP VEE 5.0 or greater
- LabVIEW 5.0 or greater
- Visual C/C++ 5.0/6.0

## Supported Instruments

### ***Oscilloscope Models Supported:***

HP 54600B  
HP 54602B  
HP 54603B  
HP 54610B  
HP 54615B  
HP 54616B/C  
HP 54620A/C  
HP 54645A/D

### ***Interface Modules Supported:***

HP 54650A  
HP 54652B  
HP 54657A  
HP 54659B

## Supported PC-to-Instrument Interfaces

### ***HP-IB (GPIB) Interface***

#### ***Supported using HP SICL (Standard Instrument Control Library):***

HP 82335B  
HP 82340A/B/C  
HP 82341A/B/C/D  
HP 82350A

#### ***Supported using National Instruments NI-488.2 Library:***

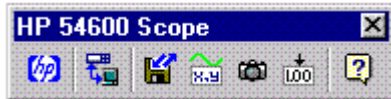
National Instruments AT-GPIB/TNT  
National Instruments PCI-GPIB  
National Instruments PCMCIA-GPIB

### ***RS-232 Interface:***

COM1  
COM2  
COM3  
COM4

## Task Reference: HP 54600 Scope Toolbar for Excel

HP BenchLink XL provides an easy-to-use toolbar that enables you to perform simple waveform data and image transfers directly into Excel. Once installed, the toolbar is automatically loaded and operates just like any other toolbar in these applications. Use the **Tools | Add-Ins** menu to add or remove the toolbar from the application.



### Connect to the Scope and Verify Communication

1. Click **Connect to Scope** on the HP Scope toolbar.
2. From the **Search Instruments** tab, click **Search** to find all instruments connected to your PC. If this is your first 'Search', all interface ports on your PC will be checked. To exclude any ports or instruments from future searches, click the **Search Criteria** tab.
3. Select the desired HP 54600-Series Oscilloscope from the list.
4. Click **Test** to verify the interface connection.
5. Click **OK** to save the connection.

**Note:** If the dialog box shows an HP 54600-Series Oscilloscope selected, then the connection has already been established.



### Get Waveform Time / Voltage Data from the Scope

1. Click **Get Waveform Data** on the HP Scope toolbar.
2. Select **New sheet** to place the waveform data in a new Excel worksheet or **Selected sheet** to use the active worksheet.
3. From the **Number of Data Points** drop-down list, select the number of points to be downloaded from the Scope.
4. Click **OK**.



## Make a Graph of the Waveform Points Obtained from the Scope

1. Click **Get Waveform Data** on the HP Scope toolbar.
2. To create an Excel graph of the waveform data obtained from the Scope, check **Make Excel graph**.
3. Select **New sheet** to place the graph in a new Excel worksheet or **Sheet with data** to use the active worksheet.
4. Click **OK**.



## Insert an Image of the Scope Display in the Spreadsheet

1. Click **Get Screen Image** on the HP Scope toolbar.
2. Select **Place in active sheet** to place the image in the active worksheet. Note that you can also save the image to a file (.bmp format).
3. Click **OK**.



## Capture a Single Measurement from the Scope

1. Click **Get Single Measurement** on the HP Scope toolbar.
2. From the **Scope Channel** drop-down list, select an enabled ('On') scope channel.
3. From the **Function** drop-down list, select the desired measurement (or 'All Functions').
4. Select the cell in which you want to place the measurement. If desired, select **with Engineering Units** to annotate each reading (mV, kHz, etc.).
5. Click **OK**.



## Save the Current Scope Settings to a File

1. Click **Save / Load Scope Settings** on the HP Scope toolbar.
2. Select **Save Scope Settings to File** and then click **OK**.
3. Navigate to the desired directory on your PC and enter a file name (.scp file extension).
4. Click **Save** to store the file.



## Download Previously-Stored Settings to the Scope

1. Click **Save / Load Scope Settings** on the HP Scope toolbar.
2. Select **Load Scope Settings From File** and then click **OK**.
3. Navigate to the desired directory on your PC and open the previously stored file (.scp file extension). Note that you can also download a file stored from HP BenchLink Scope (.stp file extension).
4. Click **Open** to open the file and download the stored settings to the Scope.

**Note:** An error may be generated if you attempt to download to a different Scope than was used to create the original settings file.

## Delete the HP 54600 Scope Toolbar from Excel

1. From the **Tools** menu in Excel, select **Add-Ins**.
2. Clear the check box next to 'HP 54600 Scope Toolbar'. Make sure that the box is not checked.
3. Click **OK**.

## Automate Tasks Using an Excel Macro

You can automate any of the operations on the HP Scope Toolbar using an Excel macro. You can then run the macro to automatically "play back" the recorded actions. Refer to the Excel help system for more information on using macros.

The recorded macro automatically lists the required arguments. You may want to record the macro in several different ways to see how the arguments are actually used. All descriptive arguments use English (non-translated) text inside the quotation marks. Numeric arguments, such as a channel number, must be enclosed in quotation marks ( "1" ) as demonstrated in the recorded macro.

For the **HP54600\_Measurement** macro, use one of the following strings in the **measureFunction** argument:

"Rise Time", "Fall Time", "Frequency", "Period", "Volt Average", "Volt RMS", "Volt Min", "Volt Max", "Volt PkPk", "PosPulseWidth", "NegPulseWidth", "Duty Cycle", "All Functions"



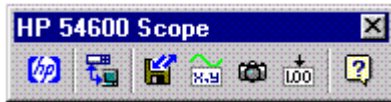
## Select the Local Language

1. Click **About HP 54600 Scope Toolbar** on the toolbar.
2. Click the **Select Language** tab.
3. Select the desired language. The dialog boxes and help system will appear in the selected language.
4. Click **OK**.



## Task Reference: HP 54600 Scope Toolbar for Word

HP BenchLink XL provides an easy-to-use toolbar that enables you to perform simple waveform data and image transfers directly into Word. Once installed, the toolbar is automatically loaded and operates just like any other toolbar in these applications. Use the **Tools | Add-Ins** menu to add or remove the toolbar from the application.



### Connect to the Scope and Verify Communication

1. Click **Connect to Scope** on the HP Scope toolbar.
2. From the **Search Instruments** tab, click **Search** to find all instruments connected to your PC. If this is your first 'Search', all interface ports on your PC will be checked. To exclude any ports or instruments from future searches, click the **Search Criteria** tab.
3. Select the desired HP 54600-Series Oscilloscope from the list.
4. Click **Test** to verify the interface connection.
5. Click **OK** to save the connection.

**Note:** If the dialog box shows an HP 54600-Series Oscilloscope selected, then the connection has already been established.



### Get Waveform Data from the Scope and Make a Graph

1. Click **Get Waveform Data** on the HP Scope toolbar.
2. From the **Number of Data Points** drop-down list, select the number of points to be downloaded from the Scope.
3. Click **OK**.



## Insert an Image of the Scope Display in the Document

1. Click **Get Screen Image** on the HP Scope toolbar.
2. Select **Place in document at cursor** to place the image in the active document. Note that you can also save the image to a file (.bmp format).
3. Click **OK**.



## Capture a Single Measurement from the Scope

1. Click **Get Single Measurement** on the HP Scope toolbar.
2. From the **Scope Channel** drop-down list, select an enabled ('On') scope channel.
3. From the **Function** drop-down list, select the desired measurement (or 'All Functions').
4. Note that you can display the measurement with a variety of annotations (units, decimal places, etc.).
5. Click **OK** to place the measurement at the cursor in the active document.



## Save the Current Scope Settings to a File

1. Click **Save / Load Scope Settings** on the HP Scope toolbar.
2. Select **Save Scope Settings to File** and then click **OK**.
3. Navigate to the desired directory on your PC and enter a file name (.scp file extension).
4. Click **Save** to store the file.



## Download Previously-Stored Settings to the Scope

1. Click **Save / Load Scope Settings** on the HP Scope toolbar.
2. Select **Load Scope Settings From File** and then click **OK**.
3. Navigate to the desired directory on your PC and open the previously stored file (.scp file extension). Note that you can also download a file stored from HP BenchLink Scope (.stp file extension).
4. Click **Open** to open the file and download the stored settings to the Scope.

**Note:** An error may be generated if you attempt to download to a different Scope than was used to create the original settings file.

## Delete the HP 54600 Scope Toolbar from Word

1. From the **Tools** menu in Word, select **Templates and Add-Ins**.
2. Clear the check box next to 'hp54600.dot'. Make sure that the box is not checked.
3. Click **OK** to delete the toolbar from the current session of Word.

**Note:** When you first install the software, the HP 54600 Scope Toolbar is automatically loaded each time you start Word. An opening dialog box is displayed which allows you to disable automatic loading of the toolbar.

## Select the Toolbar Startup Options in Word

When you first install the software, the HP 54600 Scope Toolbar is automatically loaded each time you start Word. An opening dialog box is displayed which allows you to disable automatic loading of the toolbar. If you have disabled automatic loading of the toolbar and now want to re-enable the feature, follow the steps below:

1. Locate the file named 'hp54600.dot' in the following default directory:

**\ Program Files \ Hewlett-Packard \ HP BenchLink XL \ HP54600**

2. Select the above file, click the right mouse button, and then select **Create Shortcut**.
3. Move the shortcut copy of the file to the Microsoft Office Startup folder:

**\ Program Files \ Microsoft Office \ Office \ Startup**



## Select the Local Language

1. Click **About HP 54600 Scope Toolbar** on the toolbar.
2. Click the **Select Language** tab.
3. Select the desired language. The dialog boxes and help system will appear in the selected language.
4. Click **OK**.

## Technical Support

### Complimentary Start-Up Assistance

#### Terms and Conditions

Hewlett-Packard (HP) will provide Start-Up Assistance at no charge to resolve questions relating to the installation, operation, and use of this software product. Start-Up Assistance is available to help you install the software on your PC, establish communication with a compatible instrument, and answer questions relating to the functionality of the software components provided by HP. Start-Up Assistance does not support requests to modify or enhance the functionality of the software. For services not covered by Start-Up Assistance, you may be referred to fee-based services for advanced assistance.

HP will make reasonable efforts to respond to each customer request for Start-Up Assistance within two working days, but is under no obligation to respond within a prescribed time frame. Requests for Start-Up Assistance are handled in the order in which they were received. HP will make reasonable efforts to solve customer problems, but cannot guarantee success.

*Hewlett-Packard reserves the right to terminate Start-Up Assistance at any time without notice.*

## Contacting HP for Technical Support

Country	Telephone	Fax	E-Mail
Australia	1 800 629 485	03 9272 0749	info_hptmo@aus.hp.com
Austria	—	(0180) 524-6335	Messtechnik_support@hp.com
Bangladesh	880-2-9130480	880-2-871034	jiu@bangla.net
Belgium	32-2-778.59.50	32-2-778.59.51	—
Brazil	(+55 11) 7297-8600	(+55 11) 7297-8171	Tmobrasil@hp.com
Canada	877 894-4414	(905) 206-4120	—
China	86 10 65645261	86 10 65668250	HPAcademy_China@hp.com
Czech Republic	+420 2 61307111	—	—
Denmark	45 99-15-15	+45 45 82 06 30	test_measurement@hp.dk
Europe	—	31 20 547 7700	ots_europe@hp.com
Finland	358-9-8872 2100	358-9-8872 2923	Tmodirect@finland.hp.com
France	—	01 69 82 6535	—
Germany	—	(0180) 524-6335	Messtechnik_support@hp.com
Hong Kong	(852) 2599 7889	(852) 2506 9256	—
Hungary	(36) 1 4618111	(36) 1 4618222	—
India	011-6906216	011-6826027	Sujata_sharma@hp.com
Indonesia	62-21 3800902	62-21 3518814	Tmomarketing@berca.co.id
Ireland	01 615 8222	—	—
Israel	03 53 80 377	03 53 76 505	—
Italy	—	02 92 10 40 69	hpi_direct@hp-italy-gen3.0m.hp.com
Japan	81-426-56-7832	81-426-56-7840	mac_support@om.jpn.hp.com
Korea	82/2-769-0800	82/2-784-5839	asia_ots-korea@hp.com
Luxembourg	32-2-778.59.50	32-2-778.59.51	—
Malaysia	1-800-88-8848	603-298 9157	hp-direct_my@hp.com
Mexico	(5) 258-4209	—	—
Netherlands	020 547 6669	020 547 7765	—
New Zealand	0800 738 378	04 802 6881	info_hptmo@aus.hp.com
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Spain	—	91 631 1469	—
Sri Lanka	941-597-860	941-597-863	Dayankaru@sscomp.co.ae
Sweden	(08) 444-2277	46 8 444-2525	test-measurement@sweden.hp.com
Switzerland	—	(0180) 524-6335	Messtechnik_support@hp.com
Taiwan	0800-47866	—	—
Thailand	(02) 661-3900	(02) 661-3946	—
Turkey	(90/312) 468 87 70	(90/312) 468 87 78	—
United Kingdom	01344-366666	01344-362852	Uktmo_sales@hp.com
United States	800 452 4844	888-900-8921	—
Viet Nam	844-8-229808	844-8-229553	Sysco.vn@hn.vnn

**Note:** In all other countries, please contact your local HP Representative or go to the HP web site at [www.tmo.hp.com](http://www.tmo.hp.com).